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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/522,386	12/12/2005	Laurent Breuil	10808/197	7956

48581 7590 01/29/2007
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EXAMINER

CRANE, SARA W

ART UNIT	PAPER NUMBER
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2811

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/522,386

Applicant(s)

BREUIL ET AL.

Examiner

Sara W. Crane

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 8-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 22-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. and Ovshinsky et al., 6,087,674, considered together.

With respect to claim 1, Lee et al. teaches in figure 5A a memory element (title), with phase change material 19, having two conductivity states (column 1, lines 46-50), and two electrodes 15 and 23. It would have been obvious to apply voltages to the electrodes, in order to generate the current necessary for device operation (column 7, lines 48-56). The device operation, as described in the background section, makes it clear that repeated changeover, from amorphous to crystalline states, is intended. The lower electrode is pointed at "T." The point serves to concentrate the current flow, or, alternatively, to concentrate or amplify the electric field from the electrodes. Ovshinsky is similar, with figure 2 showing the pointed bottom electrode, with advantages of the decreased size of the electrode contact at the point discussed at column 12, lines 42-48).

With respect to claim 2, the Lee figure shows the lower electrode projecting into the phase change material. With respect to claim 3, a tip is shown in figure 10A of the

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Lee reference. With respect to claim 4, figure 5A shows an angle at the top of the cone of less than 90 degrees. With respect to claim 7, the Lee layer 15 is a metal (Table 1).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. and Ovshinsky et al., '674, in view of Reinberg and Plaettner et al.

It would have been obvious to use amorphous silicon as a phase change material, because this use is taught at column 4, lines 55-59, of Reinberg. Plaettner et al. teaches at column 3, lines 11-24, that hydrogen ties up dangling bonds in amorphous silicon, improving its electrical properties by eliminating the defects associated with the dangling bonds.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. and Ovshinsky et al., '674, in view of Ovshinsky, 5,687,112.

A multilayer construction for the phase change material volume is taught by the '112 reference at column 12, lines 53-67, and would have been obvious to reduce resistance drift as noted there.

Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. and Ovshinsky et al., '674, in view of Ovshinsky et al., 5,166,758.

Figures 1 and 3-4 of Ovshinsky, '756, show matrix addressing of phase change memory cells, with a diode as the steering element, and with one addressing line in the substrate (26), and the other as a strip electrode (42). "Column" and "row" designations


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are interchangeable (turn the page sideways), as are "word line" and "bit line" for the two addressing lines in the matrix. It would have been obvious to provide the same sort of addressing scheme for any of the prior art memory cells, because an array is necessary for any sort of real memory device. With respect to claim 23, there is an ohmic junction at either end of the '756 diode. With respect to claim 24, a transistor would have been obvious instead of a diode, in order to allow for addressing using the third electrode of the transistor, as is common in memory cells.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Crane, whose telephone number is (571) 272-1652.

The supervisor for Art Unit 2811, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sara W. Crane
Primary Examiner
Art Unit 2811